AD-A035 641 AIR FORCE HUMAN RESOURCES LAB BROOKS AFB TEX F/G 5/9
APPRAISAL OF AIR FORCE TRAINING COURSE FIELD EVALUATION SYSTEM.(U)
OCT 76 R PENNELL, D HARRIS, J SCHWILLE

UNCLASSIFIED AFHRL-TR-76-63 NL

1 OF 1
ADA035641

END

DATE
FILMED
3 - 77

AFHRL-TR-76-63

12

AIR FORCE HUMAN RESOURCES LABORATORY

APPRAISAL OF AIR FORCE TRAINING COURSE FIELD EVALUATION SYSTEM

By

Roger Pennell
Dickie Harris, Capt, USAF
Jack Schwille, Maj, USAFR

TECHNICAL TRAINING DIVISION
Lowry Air Force Base, Colorado 80230

October 1976
Interim Report for Period November 1975 – June 1976

AIR FORCE SYSTEMS COMMAND
BROOKS AIR FORCE BASE, TEXAS 78235

NOTICE

When US Government drawings, specifications, or other data are used for any purpose other than a definitely related Government procurement operation, the Government thereby incurs no responsibility nor any obligation whatsoever, and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

This interim report was submitted by Technical Training Division, Air Force Human Resources Laboratory, Lowry Air Force Base, Colorado 80230, under project 1121, with HQ Air Force Human Resources Laboratory (AFSC), Brooks Air Force Base, Texas 78235.

This report has been reviewed and cleared for open publication and/or public release by the appropriate Office of Information (OI) in accordance with AFR 190-17 and DoDD 5230.9. There is no objection to unlimited distribution of this report to the public at large, or by DDC to the National Technical Information Service (NTIS).

This technical report has been reviewed and is approved.

MARTY R. ROCKWAY, Technical Director
Technical Training Division

Approved for publication.

DAN D. FULGHAM, Colonel, USAF
Commander

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: AFHRL-TR-76-63
2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)*: APPRAISAL OF AIR FORCE TRAINING COURSE FIELD EVALUATION SYSTEM.
5. TYPE OF REPORT & PERIOD COVERED: Interim rept. November 1975 – June 1976,
6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Roger Pennell, Dickie Harris, Jack Schwille
8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Technical Training Division, Air Force Human Resources Laboratory, Lowry Air Force Base, Colorado 80230
10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 62703F, 11210311, 03
11. CONTROLLING OFFICE NAME AND ADDRESS: HQ Air Force Human Resources Laboratory (AFSC), Brooks Air Force Base, Texas 78235
12. REPORT DATE: October 1976
13. NUMBER OF PAGES: 32
14. MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)*: 29p.
15. SECURITY CLASS. *(of this report)*: Unclassified
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT *(of this Report)*: Approved for public release; distribution unlimited.
17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES
19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*: data analysis, field evaluation, technical training, training evaluation
20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*:

This study was designed to develop an expanded methodology for analyzing field evaluation data, and to develop a set of recommendations for upgrading the viability of the field evaluation. Data from two field evaluation surveys were analyzed to identify meaningful clusters of tasks performed in the field. Fourteen task clusters were so identified in an inventory management sample, and eight in a materiel facilities sample. These clusters were found to represent actual jobs performed in the field. For each cluster, a number of indices were completed that provide valuable insight into both the evaluation process and the course design process. Major conclusions were (a) more flexibility should be introduced into the data analysis capability for field evaluation, (b) recommendation to course personnel should be meaningful and specific, and (c) recommendations should be made by job cluster rather than by specific task.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

SUMMARY

Problem

The purpose of this study was to take an in-depth look at the Air Force field evaluation process and to develop a methodology for improved data analysis and reporting. It was felt that the present analysis system could be expanded to provide a much more meaningful report for course personnel.

Approach

Field evaluation data for two resident training courses, Inventory Management (IM) (3ABR64530) and Materiel Facilities (3ABR64730) was analyzed into a number of cohesive task clusters using factor analysis. These clusters were then related to graduates' duty type, work environment and type of activity.

Results

Each of the task clusters was analyzed in terms of the average specialty training standard (STS) requirement and supervisor rating, as well as average percent performed (average performance rate for tasks in a cluster) and percent below standard (as defined in the STS). Training adequacy was evaluated by utilizing a training index which was the difference between average STS and average supervisor rating of a task cluster. A number of IM task clusters were found to be undertrained, while a number of clusters in each specialty were found to be overtrained.

Conclusions

Suggestions for improving the field evaluation system were (a) increased flexibility in data analysis capability, (b) feedback to the courses should be specific and meaningful, and (c) emphasis should be placed on task cluster reporting, as well as individual task reporting.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

APPRAISAL OF AIR FORCE TRAINING COURSE FIELD EVALUATION SYSTEM

I. INTRODUCTION

Technical training is primarily vocational education. It includes virtually all Air Force training other than basic military training, aircrew training, and professional education. Most technical training is achieved through organized on-the-job-training (OJT) programs or in resident courses conducted at the five technical training centers of the Air Training Command. In order to scope the technical training enterprise, the Air Training Command alone conducts approximately 1,000 different resident courses and graduates about 180,000 students annually. These courses run the gamut from relatively mundane service functions (e.g., protective coatings specialist) to exotic high technology (e.g., computer systems analyst). An important step in the training process is to evaluate the extent to which resident training is meeting the needs of the user; Air Force field evaluation was designed to accomplish this goal.

Present Field Evaluation System

The present field evaluation system is an integral part of the instructional systems development (ISD) model employed by the Air Force. Field evaluation, along with internal evaluation, constitutes Step 5 of the ISD model (see Figure 1). Field evaluation is designed to ensure that job performance requirements are met by graduates and to determine supervisors' and graduates' opinions of the training program.

In the present system, a course is evaluated based on questionnaires and field visits. Two types of questionnaires are generally used. One is for the graduate supervisor; the other is for the course graduate. In most cases, the questionnaire is designed for completion by the graduate immediate supervisor.

Field visits are performed by personnel from the Training Evaluation Division. They attempt to visit a representative sampling of graduates 3 to 6 months after the graduates' assignment to the job. Data is gathered through observation and interviews with the graduate and his supervisor.

In the present field evaluation system, the only data analysis available is in ATC Manual 52-334. The steps from designing the questionnaire to getting the data into the computer to interpreting the results are covered here. A statistical data analysis package providing analysis flexibility is not provided for use by course evaluators. The associated computer program has minimal analysis power providing only frequencies and percentages by questionnaire item. The existing system merely provided a frequency count of responses to questionnaire items. The most thoroughly analyzed items are the task proficiency ratings for each graduate. This analysis consists of computing by task the percentage of ratings which meet or exceed the STS requirement. If this percentage does not meet the established criterion of 80%, the task was considered to have not been sufficiently trained in the course.

Goal of Effective Field Evaluation

Effective field evaluation of graduates can be thought of as the quality control step in the ISD process. The field evaluation of graduates should determine how well the course prepared students to satisfy job performance requirements by identifying strengths and weaknesses in the student's job performance. In addition, it should indicate how the course might be improved in order to correct deficiencies in job performance. In essence, field evaluation data becomes a significant source of feedback to ISD personnel. Analysis of the field evaluation data should identify the strengths and weaknesses in a course. Furthermore, the field evaluation report should reflect these strengths and weaknesses, and provide input to the solution of problems.

Another aspect of effective field performance which is rarely considered is the graduate's ability to upgrade. If technical training does not provide well trained graduates who are able to effectively upgrade. the system is not fulfilling its training obligation. Data on, time to upgrade, career development course (CDC), and specialty knowledge test (SKT) scores should constitute a routine part of a field evaluation. These data should be continually tracked in order to monitor changes which occur in the field.

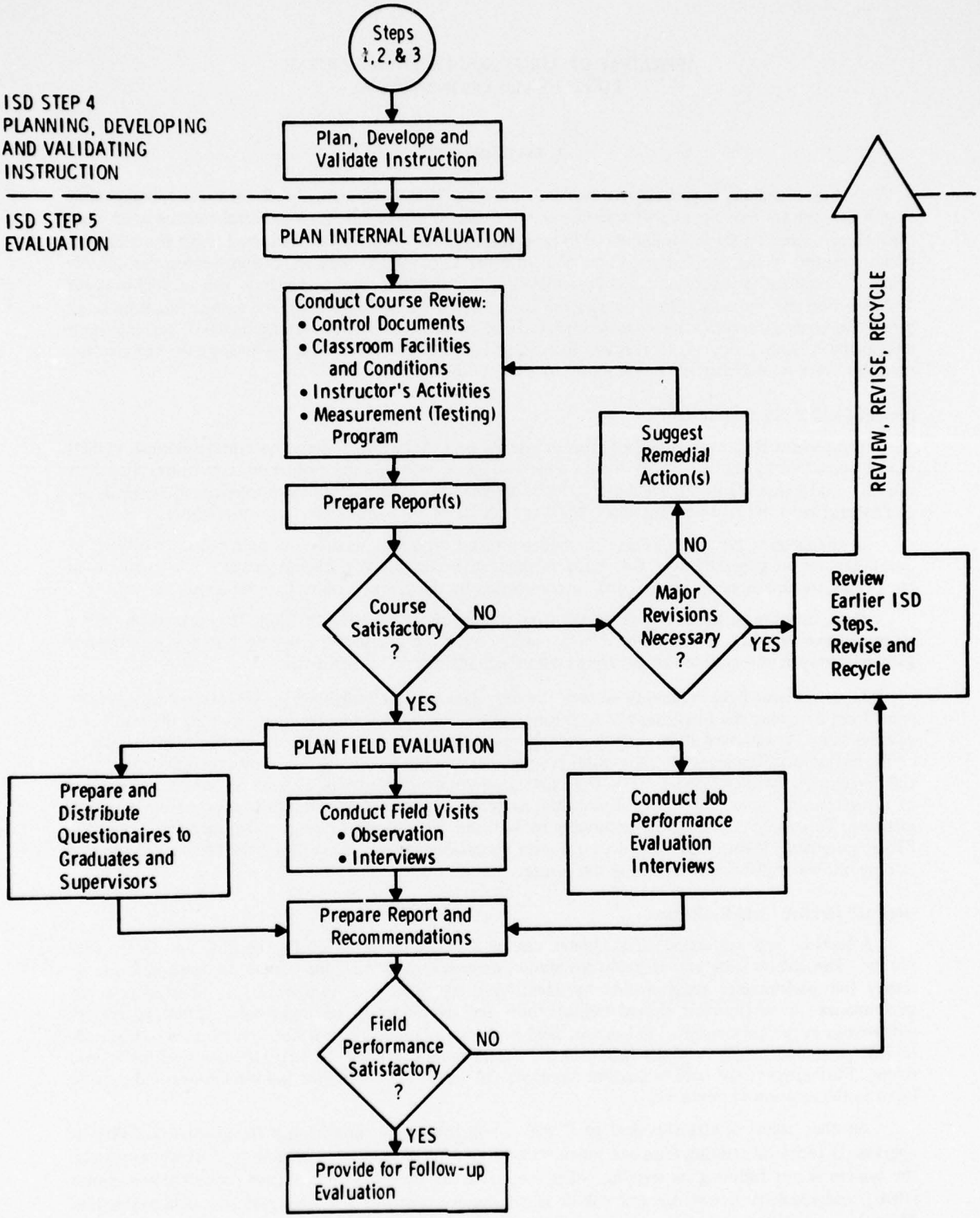

Figure 1. **Major activities and decisions of the evaluation process.**

Limitations of Field Evaluation

There is an inevitable compromise required when attempting to satisfy the goals of effective field evaluation. This compromise is between the validity of the evaluation system, in terms of how effectively the results of an evaluation bear on training decisions, and the cost of such an evaluation. Perhaps an ideal evaluation mechanism would involve "capturing" the graduate immediately after arrival at his duty assignment and administering an objectively scored job sample test. The goal of such a test would be to accurately assess the state of graduate proficiency in light of actual STS requirements. Unfortunately, such an approach would be extremely costly.

Because of the prohibitive cost of large-scale job sample testing, the Air Force uses a questionnaire based supervisor/graduate rating system for field evaluation. Supervisors are asked to rate the graduate's proficiency on a series of tasks taken from the STS. However, the potential limitations associated with any rating procedure are well known. For example, one must make assumptions concerning rater frame of reference across ratings, rater reliability, as well as a variety of possible bias effects. These problems are further confounded by the contaminating influence of OJT. That is, OJT as well as resident training contributes to the proficiency of the graduate at the time of rating by the supervisor. Other factors, such as motivation, also affect the proficiency ratings a graduate receives.

Until alternate procedures are devised, we should seek new methods and procedures to make the existing evaluation system as meaningful as possible. The data to be presented below indicate a striking degree of consistency in supervisor ratings which suggests that most supervisors have been attempting to make accurate and conscientious judgments regarding graduate proficiency. This consistency of ratings contradicts the frequent allegations concerning the lack of reliability of field followup data. Furthermore, this consistency indicates that we need to achieve more comprehensive reporting and integration of field data rather than a complete revamping of the system.

Training Evaluation in Multiple Job Specialties

Training Evaluation is also complicated by the fact that Air Force specialties are not equally homogeneous. That is, in some fields it may be fair to assume that a large number of tasks will be performed by all graduates. In other fields where graduates may be assigned to different duty sections and specialize in different activities, this assumption may not be valid. Graduate evaluation surveys must take degree of homogeneity within specialties into account. It is difficult to draw conclusions from the finding that a low percentage of graduates perform a given task without knowing whether this task is infrequently performed by all graduates in a field, or whether it is frequently performed by a subset of graduates and never performed by the rest. In a field which is relatively homogeneous, a resident course may train on only those tasks which are performed by high percentage of graduates. In a more differentiated field, the question of whether training should be provided on a task cannot be resolved by reference to a single percentage.

Thus, it is necessary for graduate evaluations to take degree of homogeneity into account. To do this, it is best if Occupational Survey Reports (OSR) are used to help design evaluation questionnaires by showing what task clusters are to be anticipated. By drawing on the OSR, the evaluator can make sure that the sample of tasks on the evaluation questionnaire adequately represents all major jobs performed by graduates in the field.

Graduate evaluation surveys and occupational surveys should complement one another. Since occupational surveys are performed but once every several years, they may become out-of-date. Graduate evaluations offer the opportunity to reassess the findings of an occupational survey with respect to the more limited population of technical training graduates. Congruency between findings from the two types of surveys also strengthens the evaluation survey, which does not have the advantage of the comprehensive task listings, extensive sampling, and controlled administration that characterize the occupational survey.

The inventory management (IM) and materiel facilities (ME) specialties are examples of heterogeneous career ladders. The OSR[1] on 5,544 airmen in these two fields produced the following conclusions:

[1] Occupational Survey Report. Occupational Survey Branch, 37000 OCM SQ, Lackland AFB, TX: 1 October 1972.

1. The IM and MF career ladders at that time were made up of 29 clusters of tasks.

2. While the career ladders were thus extremely heterogeneous, the clusters were internally homogeneous.

3. Transfer of airmen between jobs within career ladders was rare.

4. The probability that an airman in his first job assignment would perform any given task was low.

Such findings pose serious issues for training and personnel policy. From the point of view of the training organization, it is not cost effective to provide resident training on tasks which most graduates will not perform. Yet, to do otherwise, may have serious consequences for personnel assignments, utilization, and upgrading. Upgrading requirements as previously mentioned are an important factor which resident training cannot ignore. The test requirements established by the Weighted Airman Promotion System (WAPS) become an additional criterion of field performance that must be considered. If a WAPS test covers a variety of jobs, most of which the individual airman will not have the opportunity to perform, then an efficient training strategy must be devised for airmen to acquire knowledge about jobs they do not perform. To see whether graduates are in fact able to meet upgrading requirements, data on OJT and SKT performance should constitute a routine part of field evaluation.

In dealing with a multiple job field, four training strategies might be considered. It should be noted that, to make an intelligent choice among these strategies, the consequences, not just for training but for the total personnel system, must be taken into account.

Resident Training for a Variety of Jobs. This strategy would attempt to train airmen for the various jobs making up a specialty, even though the probability that a graduate will have to perform any given job is small. From the point of view of personnel policy, this strategy has a number of advantages. By creating a large pool of airmen with diverse competencies, it facilitates assignment and utilization. This strategy also gives first-term airmen a broader view of an Air Force occupation. This broader perspective may motivate airmen and help them perform more competently, although this contention has not been proved. This strategy may also give airmen a head start in preparing for WAPS tests. These advantages are counterbalanced by the high training costs incurred when airmen are trained on jobs they will not perform.

OJT (Directed Duty Assignments). An alternative is to forego resident training and depend solely upon OJT. This policy assumes that the skills involved can be learned without too much difficulty or cost in the field. The argument for OJT is also strengthened if one assumes that knowledge about how other jobs are performed contributes little to proficiency in an airman's first job. However, a broader perspective might be incorporated into this strategy by requiring systematic rotation of first-term airmen among a variety of related jobs.

Resident or Field Training on Prototypical Tasks. A compromise between comprehensive resident training and complete reliance on OJT would be to select prototypical tasks, which would facilitate the learning of other skills not formally taught. Some tasks might be taught because they are common to a number of jobs within the specialty. Others might be performed within only one job, but nonetheless provide experience and knowledge which would accelerate training on other tasks for which no training is provided. Examples from the IM specialty might include the operation of remote terminals and searches of various reference publications.

Resident Training for a Single Job. From the training point of view it would be most effective to train for a single job in the field. However, this strategy requires changes in personnel policy which would insure that an airman would be assigned to the jobs for which he had been trained and that he could be upgraded without knowledge of other jobs.

II. RATIONALE AND METHOD

Data Base and Instruments

Field evaluation data from two course surveys, originally carried out by the Lowry Training Evaluation Division, were reanalyzed for this study:

1. IM course, 3ABR64530. Information concerning students who graduated from 1 August 1975 through 17 September 1975 was obtained from questionnaires mailed from 14 November 1975 through 31

December 1975. Forty-six job tasks were selected from Specialty Training Standard 645X0, dated 4 June 1974. A total of 163 usable surveys were returned out of the 208 that were mailed.

2. MF course, 3ABR64730. This survey was completed during November and December of 1975. Thirty-two job tasks were selected from Specialty Training Standard 647X0, dated 30 May 1974. Sixty-nine usable surveys were returned out of 103 mailed.

Of interest on each survey were four types of variables: (a) the graduate's duty assignment within the Chief of Supply organization, (b) the graduate's type of work environment, (c) a classification of the type of activities which the graduate engaged in during his current assignment, and (d) ratings of job tasks selected from the STS. These variables are listed in Appendices A and B. These job task ratings consisted of the supervisor's appraisal of the student's performance on a scale from 0 to 5. A rating of 0 corresponded to "incapable of performing," 1 to "extremely limited," 2 to "partially proficient," 3 to "competent," 4 to "highly proficient," and 5 to "not performed."

Defining Task Clusters

In order to relate graduate performance to the various jobs in the MF and IM fields, the task ratings were used to derive a group of task dimensions or clusters for each specialty and then these clusters were characterized in terms of type of duty, activity, and work variables. These latter variables served to define jobs (i.e., clusters of tasks) or parts of jobs which the sample of graduates found themselves performing after graduation. It was the intention, then, to evaluate training at the general task cluster level rather than the specific task level. It was hypothesized that this approach would lend considerable clarity to field evaluation reporting, and would have many implications for training modification.

As mentioned earlier, each graduate was rated as "not performing" (5) or on a continuum of quality of performance (0–4) for those tasks listed on the field questionnaire. Initially, this data was regarded as a binary classification of tasks into categories of "performed" or "not performed" for each graduate. Thus, each task was scored as a 1 if it was given a rating of 0–4 and scored it 0 if the rating was 5.

Included in this first analysis was a set of new variables corresponding to type of duty (listed in Appendix A). For each specialty (i.e., IM or MF) there was list of duty areas in which the graduate performed. The supervisor was asked to check the duty area in which the graduate worked. Duty variables were then created by scoring 1 if the graduate was checked as being in this duty area, and 0 otherwise.

These duty variables were combined with the binary task variables, intercorrelated and factor analyzed. Factor analysis is a procedure whereby clusters of correlated variables are identified which define a more global variable that we shall call a task cluster. The variables defining each task cluster can be deduced from a factor loading matrix. All variables having a high factor loading on a particular factor are combined conceptually into a task cluster.

At this point, factor scores for each graduate on each of the factors are computed. Factor scores can be regarded as similar to scores on any test. A high factor score says that a graduate scored high on the cluster of tasks defining the factor. In this case, a high score indicates that those tasks the graduate was rated as performing were very much like those tasks defining the factor. Thus, we used the factor scores to classify graduates as either belonging to or not belonging to a particular task cluster. Some of the graduates did not score high on any of the task clusters. This indicated either that the questionnaire did not include enough of the tasks that certain graduates were expected to perform on the job or that some graduates performed unique configurations of the tasks on the questionnaire.

Relating Task Clusters to Other Variables. Once this initial analysis was performed, we could ask how other classifying variables related to the identified task clusters. The classifying variables we were interested in were: (a) type of work environment, and (b) general types of work activities performed by graduates (Appendix A). This produced an additional set of 32 binary variables indicating "performed" or "not performed." Each of these variables was related to an original task cluster in the sense of how much each variable correlated with each task cluster. This proved to be another aid in defining the nature of the particular job.

III. RESULTS

Mean Level of Performance by Task and Duty

As a first step in the analysis, means were computed for all the binary variables to be factor analyzed. These means are listed in Appendices C and D, under the factors to which the variables were ultimately assigned. Each mean reflects the proportion of graduates in the sample who performed the task in question. For example, Task 1 (T1) has a mean of .17 in the IM sample; in other words, 17% of the graduates in the sample performed this task.

Table 1 summarizes these computations by showing the number of tasks at different rates of performance. It shows that 17 of the 46 tasks on the IM questionnaire were performed by less than 10% of the graduates. In general, the incidence of task performance was low, particularly in IM where only three tasks were performed by more than 40% of the graduates. These results were consistent with the results of the occupational survey of 1972. In that survey, the task most frequently performed by airmen in their first assignment was to operate remote keyboard printers. This task was performed by 32% of such airmen. The same task was tied for the most frequently performed task in the graduate evaluation sample, with 49% of the graduates performing the task. These data indicated low utilization of training, at least as far as direct task performance was concerned.

Table 1. **Distribution of Tasks by Percentage of Graduates Performing**

% Performing Task	Number of Tasks	
	Inventory Management	Materiel Facilities
60 or more	0	2
50–59	0	5
40–49	3	7
30–39	6	6
20–29	10	6
10–19	10	5
0–9	17	1

Task Clusters

The results of the factor analysis are displayed in Appendices C and D, which lists the tasks, duties, activities and work environments making up each cluster. Opposite each task statement is the factor loading, a measure which expresses how important the task or duty was in defining the factor. A factor loading can range up to a maximum of 1.0. A task or duty had to exceed .3 (an accepted rule-of-thumb) in order to be included in the cluster. An airman who performed only those tasks whose loading is high on a factor had a job which better fit the cluster than did an airman who performed only those tasks whose loadings were low. The second column of figures in Appendices C and D gives the proportion of graduates rated as having performed the task. This proportion was computed on the entire sample, not just on airmen assigned to the cluster in question.

The factor analyses reconfirmed the heterogeneity found in the occupational survey report. In the graduate evaluation, 14 task clusters were found in IM and 8 in MF. Twenty-nine clusters were derived in the occupational survey. Differences between the two surveys were at least partly attributed to differences in instruments used, populations sampled, and clustering procedures.

In spite of the differences between the two surveys, much similarity existed between the two sets of clusters. For example, IM Factor 1, Allowance and Authorization, was very much like group 66 of the occupational survey report (OSR printout pp. 168–175). The seven most highly loaded tasks in Factor 1 were all among the top twenty tasks of group 66 on the occupational survey (the occupational survey tasks being ranked by the average percent of time spent by members of the group performing the task). The top task was the same in both cases, namely, "prepare/complete custodian request receipt." In contrast, task 31, according to instructor personnel from the IM course staff, did not really belong in this cluster. It may be seen that its loading was much lower than the loadings of other tasks in the factor.

Considering IM only, those factors, listed below were identified with the indicated OSR clusters:

Graduate Evaluation Factors	Occupational Survey Cluster
1	66
2	131
3	236
4	722
5	48
6	55
7	390
9	54
11	55
13	577

The degree of overlap between corresponding clusters varied, but in all cases a number of the graduate evaluation tasks appeared among the top twenty tasks in the OSR.

In contrast, the tasks in Factor 8, Special Level Detail Maintenance, were not prominent among the top 20 tasks in any of the occupational survey clusters. Likewise, Factor 10, Equipment Control (with only two tasks) and Factor 14, Materiel Control, showed little correspondence with any of the clusters in the occupational survey. The tasks of Factor 12, Research Publications, were found among the top tasks in clusters 236, 207, and 250, one of which was the primary research cluster in the occupational survey. Factors 6 and 11 were both included in the above table, but it should be noted that they both related to the same occupational survey cluster, number 55.

The duty type variable provided additional means of interpreting the clusters. It was of interest to note cases where a duty type failed to be associated with any of the task clusters and where a task cluster failed to be associated with a duty type. For IM, each of the duty types came out on one of the 14 clusters. Since the duty type "other" was consistently associated with punch card accounting machine (PCAM) activity, PCAM should be listed in future questionnaires as a duty type. Inasmuch as there were 10 duty types and 14 task clusters, four of the clusters were not characterized by a duty type. Those four clusters were 1, 8, 9, and 12. Experts in the field may be able to provide better job titles for these clusters than those in Table 2, however, it was clear that these duties represented identifiable task clusters and should appear on future field questionnaires.

For the MF data, where only eight significant task clusters were found, two of the duty types were not represented in the sample of graduates at all (inspection and BCE support). This could represent inadequate sampling or nonexistence of such duty types in the field. On the other hand, two duty types (base service store and bench stock) nominally existed in the field, but there was no identifiable cluster of tasks associated with these duties. This could be due to the fact that the appropriate tasks were not included on the questionnaire or that there was little or no commality of performed tasks from one duty station to another for these tasks. Also in the MF sample, two task clusters (2 and 3) were identified that had no associated duty types. These were tentatively labeled as "receiving" and "warehousing/remote devices." These duty types should be included on future questionnaires. Also, cluster 5 was consistently associated with D10, which was "other." This cluster involves inventory tasks and should probably be broken out as a separate duty type.

Table 2. **IM/MF Factors (Task Clusters)**

Factor	Task Clusters
	Inventory Management
1	Allowance and Authorization
2	Demand Processing
3	Research (File Maintenance)
4	Repair Cycle Support
5	Individual Equipment
6	Requirements and Requisitioning I
7	Inventory
8	Special Level Detail Record Maintenace
9	Document Control
10	Equipment Control
11	Requirements and Requisitioning II
12	Research Publications
13	PCAM (Other)
14	Materiel Control
	Materiel Facilities
1	Warehousing (issuing)
2	Receiving
3	Warehousing/Remote Devices
4	Receiving and Documentation
5	Warehousing
6	Pickup and Delivery
7	War Readiness Materiel (WRM)
8	Supply Point

Training Indices

The ratings for the tasks in each of the task clusters were averaged across supervisors to evaluate the rated proficiency of the task cluster. Recall that after the factor analysis, scores for the graduates on each of the task clusters were computed. A high score for a particular cluster indicated that there was a high similarity between the graduate's rated tasks and the tasks in the task cluster. Thus, graduates were allocated to one or more task clusters if their score on that cluster was sufficiently high. Tables 3 and 4 present data regarding the actual ratings within clusters for IM and MF, respectively. The column marked "Graduates" indicates the actual number of graduates assigned to the task cluster. The column marked N indicates the number of rated tasks for graduates allocated to a task cluster. A task was considered rated if the rating was other than 5 (not performed). Small Ns (less than 20) indicate that the rating data will have low reliability, and that we cannot have great confidence in the data for that cluster.

The column marked "Mean Standard" is the average STS requirement for the tasks found in the cluster, while "Mean Rating" indicates the average rating assigned by supervisors to the tasks in the task cluster. The Training Index (TI) was merely the extent to which supervisor ratings differed from STS requirements. Except for the contaminating influence of on-the-job experience, TI might be regarded as an index of over or undertraining—positive numbers indicating overtraining and negative numbers indicating undertraining. In that sense, all clusters are overtrained except for cluster 7 in MF. It should be kept in mind that because a cluster was over- or undertrained, this did not imply that every task in the cluster was over or undertrained, since TI was an average over tasks.

These data should be interpreted in light of the last two columns in the tables. "Percent Performed" indicates the average performance rate of the tasks within a cluster. That is to say, the average performance rate for tasks in a cluster over the entire sample. "Percent Below Standard" indicates the percent of tasks within a cluster which were rated as being below STS requirements.

Table 3. **Inventory Management Job Clusters**

Cluster	Graduates	N[a]	Mean Standard	Mean Rating	Training Index[b]	Percent Performed	Percent Below Standard
1	9	44	2.0	2.1	+0.1	2.8	36.0
2	28	118	1.6	3.1	+1.5	35.0	2.0
3	18	68	1.8	2.7	+0.9	26.0	15.0
4	18	63	2.0	2.9	+0.9	12.6	5.0
5	15	55	2.0	1.8	+0.8	14.0	18.0
6	20	69	1.83	2.7	+0.9	19.8	7.0
7	18	43	2.0	2.2	+0.2	11.3	21.0
8	13	66	1.9	2.0	+0.1	10.6	35.0
9	31	120	1.67	3.2	+0.5	25.8	1.0
10	11	10	1.50	3.2	+1.7	8.0	0.0
11	10	47	1.67	3.1	+1.5	27.8	0.0
12	34	95	2.0	2.8	+0.8	27.3	7.0
13	34	102	1.8	2.7	+0.9	25.2	10.0
14	16	15	1.33	2.2	+0.9	16.3	20.0

[a]N=Number of rated tasks for graduates assigned to a task cluster.

[b]Positive numbers indicate overtraining; negative numbers indicate undertraining.

Table 4. **Materiel Facilities Job Clusters**

Cluster	Graduates	N[a]	Mean Standard	Mean Rating	Training Index[b]	Percent Performed	Percent Below Standard
1	13	117	2.0	3.3	+1.3	43.3	1.7
2	18	136	2.0	3.1	+1.1	41.9	4.4
3	9	89	2.0	2.3	+0.3	25.0	24.7
4	6	20	2.0	3.0	+1.0	28.1	0.0
5	5	33	2.0	3.1	+1.1	29.9	9.1
6	9	25	2.0	2.8	+0.8	60.6	12.0
7	6	40	2.0	1.4	−0.6	23.2	60.0
8	5	7	2.0	3.3	+1.3	32.6	0.0

[a]N=Number of rated tasks for graduates assigned to a task cluster.

[b]Positive numbers indicate overtraining; negative numbers indicate undertraining.

The relationship between TI and "Percent Performed" is plotted in Figure 2. The plot has been divided into three non-overlapping areas labeled "overtraining," "undertraining," and "cost-effective training." The manner in which the three areas were formed was arbitrary in the sense that particular partitioning is an expression of system philosophy about the goals of resident training. For example, the overtraining area included any task cluster which was performed by less than 10% of the sample and any cluster with a TI greater than 1.0. Perhaps a more reasonable partition would include any cluster performed by less than 20% of the sample. As can be seen, the cost-effective training zone is a triangle. The hypotenuse of the triangle is an expression of the philosophy that relative overtraining could be tolerated for tasks performed with high frequency, while relative undertraining could be tolerated for tasks performed with low frequency. Of course, these are broad generalizations which may not hold for specific

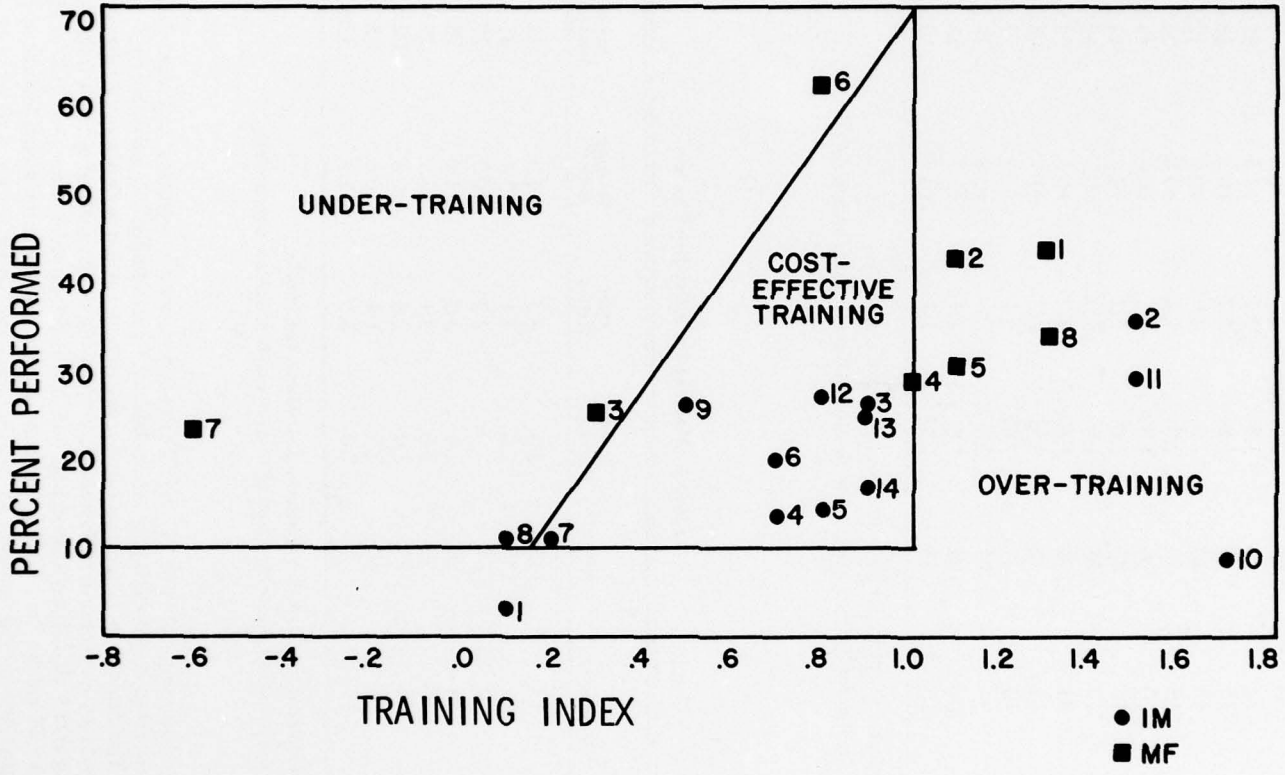

Figure 2. **Relation between training index and percent performing.**

situations. For example, tasks required in the event of a breach in safety will be performed with very low frequency by all; however, one would certainly argue that it is essential that everybody be highly trained in these tasks. These considerations imply that there are other dimensions to consider when dealing with cost-effective training. The above example indicates that a dimension such as consequences of first-performance-failure may override other considerations. At any rate, it is clear an operationalized partition has important implications for cost-effective technical training.

Based on the example partition in Figure 2, there were a number of task clusters which seemed to be overtrained: clusters 1, 2, 10, and 11 in IM and 1, 2, 5, and 8 in MF. On the other side, cluster 8 in IM and 3, 6, and 7 in MF seemed to be undertrained. There were a total of ten clusters falling into the cost-effective zone. If the overtraining zone included tasks performed by less than 20% of the sample, there would be only four task clusters in the cost-effective zone.

An interesting point was that the so-called cost-effective zone was a relatively small portion of the entire area. Thus, accomplishing cost-effective training, at least for these two courses, represents a considerable training challenge.

Unclassifiable Graduates

It was pointed out earlier that the sampling procedure had an important influence on the task clusters which were identified. Most of the clusters found in each sample paralleled those found in the OSR. Somewhat more in-depth analysis was available by examining the graduates who were not classifiable into any of the clusters.

Some graduates were not classified into any of the job clusters. An unclassifiable graduate resulted when scores on all clusters were low; essentially, these graduates performed clusters of tasks which were unlike any other cluster in the sample. The percentage of such graduates was rather low in IM (9.8%); however, about 25% of the MF graduates were unclassifiable.

To some extent, these graduates could be airmen who were assigned outside base supply, and who for that reason had somewhat idiosyncratic jobs. If the jobs were not idiosyncratic, then questionnaires may have been deficient in not representing the range of tasks to which the 3-level graduate was assigned. This situation could be prevented if, before the survey, experts in the specialties compared the graduate evaluation questionnaires with previous OSRs.

IV. DISCUSSION AND RECOMMENDATIONS

Optimal Evaluation Instrument

Ideally, an evaluation instrument should allow the evaluator to make meaningful recommendations concerning task clusters as well as individual tasks. These recommendations should allow training personnel to evaluate instruction in the light of operationally defined job types. That is, this type of analysis gives the training personnel an idea of the tasks which constitute a job and the relative rated proficiency with which the job is performed. This type of analysis also has the advantage of removing tasks irrelevant to the job and training students only on required tasks.

The evaluation instrument should emphasize how tasks are clustered together by duty types. By this, we mean that during the development of the evaluation instrument, the evaluator should attempt to ensure that jobs which exist in the field are represented in the questionnaire by appropriate tasks and duty types. Earlier occupational survey reports can be used to suggest clusters that should be represented. To provide better coverage of the various clusters, the questions on the graduate evaluation questionnaire concerned with duty assignment, work environment and activities should be coordinated to give a progressively more refined description of the graduate's location in the organization and his major responsibilities. For example, a questionnaire might include as duty types all the sections within an organization; the work environment variables might include all the units within sections; and the activities might be major functions performed within the units. In this way, the evaluator can denote each task cluster by very specific descriptions.

The optimal evaluation instrument should also allow the evaluator to make specific recommendations about which tasks are best taught together. For example, the analysis of the IM and MF surveys suggests

that tasks associated with specific task clusters might be taught together as a unit of instruction. These recommendations are based on objective evidence gathered from the field. That is, field supervisors have reported that a specific duty tends to be made up of a cohesive cluster of tasks.

Of course, the instrument should allow the evaluator to draw conclusions about the adequacy of training received in the course. Our analysis allowed the comparison of percent performed, training index, and percent below standard. These measures have implications for course design (i.e., amount of training required) as well as providing a measure of training adequacy. For example, if a small percentage of the population performs a task cluster and the average performance is rated well above standard, this suggests that perhaps *the course* is overtraining individuals performing that job. Likewise, if the training index is negative or only slightly positive, a high percentage of the population performing the job, and a high percentage (20%) rated as below standard, this suggests that training for that specific job is inadequate.

It should be noted that field evaluations for a particular course are conducted approximately every two years. This has the effect of leaving the feedback loop open (see Goal of Effective Field Evaluation). After a course is evaluated, recommendations for changes are made; however, the impact of the changes is not measured again for two years. This lapse has the effect of blurring the entire evaluation process. The methodology utilized here employed only three major variables plus a set of task descriptors. A short-form questionnaire could be used as a check on any course modifications instituted as a result of the original survey. This in effect would close the feedback loop and furnish timely, pertinent data to instructional personnel.

Modification of the Field Evaluation System

The results of this study suggest some modifications to the field evaluation system, especially in the areas of questionnaire design, data analysis, and interpretation of results. The cornerstone of any survey technique is the instrument used to gather the data. Our results suggest that the instruments being used in the present field evaluation system could be improved in several ways. First, the tasks which are included in the instrument should be carefully selected so that they are representative of those tasks which are performed frequently by job incumbents. Although the STS provides a criteria for performance, one cannot rely solely on the STS for the selection and definition of tasks. In developing a field evaluation questionnaire, previous OSRs and evaluation reports should be carefully studied and the findings discussed with experienced personnel from the fields being evaluated. The results of this exercise may reveal certain inadequacies and ambiguities in the STS, which need to be taken into account during the survey, and which should lead to revision of the STS. Second, the duty descriptors should be selected so that they represent the known jobs in the field. Finally, the work environment and activity variables should be selected so that they provide a molecular description of the job. In this way, a task cluster can be defined in very molar (i.e., duty) or molecular (i.e., work environment) terms.

The types of data analysis performed in this study also allow the evaluator to make recommendations to the course concerning areas of possible undertraining or overtraining, and about the organization of training material. Furthermore, there are strong implications about how training goals should be modified. For example, our analysis of the IM course suggests that a combination of resident training and OJT leads to substantial overtraining on cluster 2, (Demand Processing) and cluster 11, (Requirements and Requisitioning II). This type of empirical data is what is needed by training personnel when making decisions about increasing or decreasing training in a particular area. The point, really, is that for a field evaluation process to be viable, the evaluator *must* make concrete recommendations for curriculum change, rather than merely presenting data for a list of tasks.

Throughout the conduct of the present effort, the investigators were continually struck by the consistency with which supervisors responded to questions about which tasks were being performed. The task clusters were crisp and clearly defined. This indicates that our field personnel *are*, by and large, making an effort to provide the best possible input for course evaluation. Because of this, we should make every effort to optimize the utility of field evaluation.

Recommendations

In summary, we suggest that the field evaluation system be modified in several ways. First, more flexibility should be introduced into the data analysis capability so that standard statistical techniques, such as factor analysis and regression analysis can be used. The present analysis system (ATCM 52 334)

essentially is limited to summarizing percentages by task, and does not have the capability for in-depth analysis such as was done here. Second, recommendations to the course should be meaningful and specific. For example, the problems of undertraining and overtraining should be addressed along with suggested reorganization of training materials, if appropriate. And finally, all recommendations should be made by task clusters, as well as specific tasks. This approach reveals which jobs need more or less training rather than individual tasks which in- and of-themselves may not be critical in the successful performance of a job.

REFERENCES

ATC Manual 52-334. *Graduate evaluation questionnaire ATC.* Randolph, AFB, TX: 1 May 1974.

Occupational Survey Report. USAF Occupational Measurement Center, Occupational Survey Branch. Lackland AFB, TX: 1 October 1972.

Occupational Survey Report Printout. USAF Occupational Measurement Center, Occupational Survey Branch. Lackland AFB, TX.

APPENDIX A: INVENTORY MANAGEMENT INSTRUMENT

Duties

D1	Equipment Control
D2	Individual Equipment
D3	Requirements and Requisitioning
D4	Research
D5	Demand Processing
D6	Inventory
D7	Stock Control
D8	Repair Cycle Support
D9	Material Control
D10	Other

Work

W1	Punch Card Accounting Machines (PCAM)
W2	Requisitioning of Property
W3	Materiel Control – Records Validation
W4	Stock Control Clerk
W5	Operating Remote Devices
W6	Delivering Supplies and Equipment
W7	Researching Publications and Files
W8	Maintaining Records, Files and Publications
W9	Inventorying Supplies and Equipment
W10	Other

Activities

A1	Set Up Work Process Files
A2	Establishment, Change, and Deletion of A Special Level Detail Record
A3	Perform Final Quality Control of Source Documents
A4	Reporting of Excess Material
A5	Log in AF Forms 601b and Assign to Each an EMO Control Number
A6	Identify Delinquent Documents
A7	Assignment of Equipment Authorization Inventory Data (EAID) Authorized In-Use Detail Document Number
A8	Annotation of AF Forms 601b with Date and Transaction Serial Number
A9	Inventory Supplies and Equipment
A10	Prepare and Input Warehouse Location Data
A11	Initiate Follow-up Action on Requisitions
A12	Correct or Annotate Issue or Shipping Documents
A13	Deliver Bench Stock Items
A14	Prepare AF Forms 2005, Issue Request for Routine and Priority Issues
A15	Drive Car or Pickup Truck
A16	Maintain Publications
A17	Research Publications
A18	Maintain Records and Files
A19	Research Files
A20	Update Stock Number Directory
A21	Prepare and Annotate Turn-In Documents
A22	Other

Tasks

T1	Conduct sample/cycle, special and EAID inventories
T2	Correct inventory discrepancies

T3	Research standard publications to determine policy
T4	Prepare inputs to load, change, or delete item records
T5	Prepare inputs to load, change, or delete interchangeability and substition group records
T6	Maintain work listings and external files
T7	Prepare non-federal stock number control forms
T8	Maintain computer input suspense files
T9	Research supply publications for supply transaction data
T10	Research technical publications for supply transaction data
T11	Distribute automatic data processing equipment products
T12	Maintain document and support files
T13	Identify delinquent documents
T14	Operate remote keyboard printer
T15	Operate keypunch
T16	Edit File Maintenance Transactions
T17	Prepare inputs to load, change, or delete Exception Codes
T18	Prepare inputs to load, change, or delete Special Levels
T19	Complete forms and request approval for special levels
T20	Maintain special level justification data
T21	Prepare forced due-out release inputs
T22	Revalidate due-outs and due-ins
T23	Prepare documentation and inputs for off-line shipments
T24	Prepare documentation and inputs for off-line transfers to Defense Property Disposal Activity
T25	Prepare documentation and inputs for off-line requisitions
T26	Prepare issue inputs for computer processing
T27	Prepare turn-in inputs for computer processing
T28	Maintain Control Register
T29	Process management notices, reject and inquiries
T30	Process post transactions
T31	Establish and maintain authorization lists and master bench stock cards
T32	Prepare supply point input transactions
T33	Maintain the Due-In from Maintenance (DIFM) suspense file
T34	Prepare inputs to update DIFM detail records
T35	Prepare turn-in documents for DIFM items
T36	Prepare/complete custodian request-receipts
T37	Research allowance documents to determine equipment allowances
T38	Prepare inputs to load, change, or delete Equipment Authorization Inventory Data (EAID) in-use detail records
T39	Prepare inputs to record transfers of equipment between custody accounts
T40	Screen, update, and file allowance source code listings
T41	Screen, update, and file Custodian Authorization-Custody Receipt Listings and related products
T42	Screen, update, and file allowance and authorization documents
T43	Document and issue and turn-in of personal retention items
T44	Document and issue and turn-in of organization equipment items
T45	Document and issue and turn-in of tools and tool kits
T46	Document and issue and turn-in of mobility items and kits

APPENDIX B: MATERIEL FACILITIES INSTRUMENT

Duties

D1	Receiving
D2	Inspection
D3	Warehousing
D4	Pickup and Delivery
D5	Base Service Store
D6	WRM
D7	Supply Point
D8	BCE Support
D9	Bench Stock
D10	Other

Work

W1	Receiving Property
W2	Inspecting, Identifying and Classifying Property
W3	Storing Supplies and Equipment
W4	Issuing, Shipping and Transferring Supplies and Equipment
W5	Operating Remote Devices
W6	Delivering Supplies and Equipment
W7	Researching Publications and Files
W8	Maintaining Records, Files, and Publications
W9	Inventorying Supplies and Equipment
W10	Other

Activities

A1	Offload supplies and equipment
A2	Compare physical count with information contained in receiving document, tags, labels and markings
A3	Prepare extract receiving documents
A4	Move property to areas such as delivery or storage
A5	Input receiving information to computer
A6	Place property in warehouse bins, racks, or bays
A7	Move property to pick-up and delivery units
A8	Locate items to be issued, shipped, or transferred
A9	Inventory supplies and equipment
A10	Prepare and input warehouse location data
A11	Prepare or correct bin labels
A12	Correct or annotate issue or shipping documents
A13	Deliver property items
A14	Operate materiel handling equipment
A15	Drive car or pickup truck
A16	Maintain publications
A17	Research publications
A18	Maintain records and files
A19	Research files
A20	Update stock number directory
A21	Prepare and annotate turn-in documents
A22	Other

Tasks

T1	Perform remote device operator maintenance
T2	Clear rejects

T3	Verify operating procedures
T4	Prepare labels and tags for property
T5	Prepare/process stock change documents
T6	Prepare property for inchecking
T7	Compare information on tags and labels against documentation
T8	Prepare extract documents
T9	File, update, and input receipt due-in cards
T10	Enter information on receiving documents
T11	Process management notices
T12	Move property to holding area
T13	Move property to delivery area
T14	Move property to storage area
T15	Prepare turn-in documents
T16	Operate remote keyboard printer
T17	Operate remote card reader
T18	Place location symbols on storage facilities
T19	Prepare and correct bin labels
T20	Update stock number directory
T21	Prepare and input warehouse location data
T22	Process output documents and listings
T23	Locate and select property as indicated on documents
T24	Complete document entries
T25	Move property to delivery point
T26	Prepare warehouse for inventory
T27	Make emergency issues
T28	Process inquiries
T29	Apply proper methods for handling property
T30	Obtain authorized representative signatures
T31	Maintain warehouse document file
T32	Distribute documents

APPENDIX C: INVENTORY MANAGEMENT FACTORS

Task Nr	Task Statement	Loading	Proportion Performing*
Factor 1 – Allowance and Authorization			
T36*	Prepare/complete custodian request receipts	.88	.04
T42	Screen, update and file allowance and authorization documents	.85	.03
T41	Screen, update and file custodian-authorization custody receipt listings and related products	.82	.05
T39	Prepare inputs to record transfers of equipment between custody accounts	.81	.04
T37	Research allowance documents to determine equipment allowances	.76	.04
T40	Screen, update and file allowance source code listings	.73	.02
T38	Prepare inputs to load, change or delete Equipment Authorization Inventory Data (EAID) in-use detail records	.65	.04
A07**	Assignment of EAID authorized in-use detail document number	.54	.01
T31	Establish and maintain authorization lists and master bench stock cards	.35	.05
Factor 2 – Demand Processing			
D5@	Demand processing	.83	.15
T28	Maintain control register	.82	.31
T30	Process post transactions	.81	.29
T26	Prepare issue inputs for computer processing	.79	.41
T29	Process management notices, reject and inquiries	.72	.49
A14	Prepare AF Forms 2005, Issue request for routine and priority issues	.65	.34
W5#	Operating remote devices	.46	.10
T27	Prepare turn-in inputs for computer processing	.38	.26
Factor 3 – Research (File Maintenance)			
D4	Research	.81	.11
T4	Prepare inputs to load, change or delete item records	.78	.19
T5	Prepare inputs to load, change or delete interchangeability and substitution group records	.78	.09
T7	Prepare non-federal stock number control forms	.67	.14
W7	Researching publications and files	.63	.09
A20	Update stock number directory	.51	.13
T14	Operate remote keyboard printer	.34	.49
T6	Maintain work listings and external files	.29	.39
Factor 4 – Repair Cycle Support			
T34	Prepare inputs to update DIFM detail records	.92	.10
T35	Prepare turn-in documents for DIFM items	.89	.11

Task Nr	Task Statement	Loading	Proportion Performing*
Factor 4 – Repair Cycle Support (Continued)			
T33	Maintain the DIFM suspense file	.88	.11
D8	Repair cycle support	.85	.07
T32	Prepare supply point input transactions	.70	.06
A21	Prepare and annotate turn-in documents	.48	.22
T27	Prepare turn-in inputs for computer processing	.31	.26
Factor 5 – Individual Equipment			
T43	Document and issue and turn-in of personal retention items	.89	.07
D2	Individual equipment	.85	.04
T44	Document and issue and turn-in of organization equipment items	.85	.08
A10	Prepare and input warehouse location data	.51	.07
T46	Document and issue and turn-in of mobility items and kits	.48	.04
T45	Document and issue and turn-in of tools and tool kits	.40	.06
A21	Prepare and annotate turn-in documents	.37	.22
T27	Prepare turn-in inputs for computer processing	.32	.26
T17	Prepare inputs to load, change or delete Exception Codes	.30	.15
Factor 6 – Requirements and Requisitioning I			
D3	Requirements and requisitioning	.85	.14
T22	Revalidate due-outs and due-ins	.70	.29
T23	Prepare documentation and inputs for offline shipments	.60	.20
T25	Prepare documentation and inputs for offline requisitions	.56	.26
T21	Prepare forced due-out release inputs	.56	.25
W4	Stock control clerk	.54	.13
A11	Initiate follow-up action on requisitions	.46	.31
T24	Prepare documentation and inputs for offline transfers to Defense Property Disposal Activity	.42	.12
T19	Complete forms and request approval for special levels	.31	.07
W2	Requisitioning of property	.30	.11
Factor 7 – Inventory			
T2	Correct inventory discrepancies	.89	.14
D6	Inventory	.85	.06
T1	Conduct sample/cycle, special and EAID inventories	.82	.17
W9	Inventorying supplies and equipment	.76	.08
A9	Inventory supplies and equipment	.54	.20
T38	Prepare inputs to load, change or delete Equipment Authorization Inventory Data (EAID) in-use detail records	.38	.04

Task Nr	Task Statement	Loading	Proportion Performing*
Factor 8 – Special Level Detail Record Maintenance			
T20	Maintain special level justification data	.80	.08
T18	Prepare inputs to load, change or delete special levels	.75	.07
T19	Complete forms and request approval for special levels	.73	.07
A2	Establishment, change and deletion of a special level detail record	.45	.06
T11	Distribute automatic data processing equipment products	.37	.21
T45	Document and issue and turn-in of tools and tool kits	.37	.06
T31	Establish and maintain authorization lists and master bench stock cards	.37	.05
T17	Prepare inputs to load, change or delete Exception Codes	.35	.15
T24	Prepare documentation and inputs for offline transfers to Defense Property Disposal Activity	.30	.12
T16	Edit File Maintenance Transactions	.29	.10
Factor 9 – Document Control			
T12	Maintain document and support files	.77	.30
T8	Maintain computer input suspense files	.75	.30
T6	Maintain work listings and external files	.73	.39
T13	Identify delinquent documents	.42	.25
T16	Edit file maintenance transactions	.36	.10
A18	Maintain records and files	.34	.52
T11	Distribute ADP equipment products	.34	.21
Factor 10 – Equipment Control			
D1	Equipment control	.88	.05
T24	Prepare documentation and inputs for off-line transfers to Defense Property Disposal Activity	.56	.12
T46	Document and issue and turn-in of mobility items and kits	.37	.04
Factor 11 – Requirements and Requisitioning II			
D7	Stock control	.84	.05
T25	Prepare documentation and inputs for off-line requisitions	.60	.26
T21	Prepare forced due-out release inputs	.55	.25
T23	Prepare documentation and inputs for off-line shipments	.40	.20
T27	Prepare turn-in inputs for computer processing	.36	.26
T26	Prepare issue inputs for computer processing	.35	.41
A11	Initiate follow-up action on requisitions	.34	.31
T22	Revalidate due-outs and due-ins	.33	.29

Task Nr	Task Statement	Loading	Proportion Performing*
Factor 12 – Research Publications			
T9	Research supply publications for supply transaction data	.83	.37
T3	Research standard publications to determine policy	.70	.23
T10	Research technical publications for supply transaction data	.69	.30
W7	Research publications and files	.38	.09
T4	Prepare inputs to load, change or delete item records	.32	.19
Factor 13 – Punched Card Accounting Machines (PCAM)			
T15	Operate keypunch	.80	.26
T13	Identify delinquent documents	.55	.25
T14	Operate remote keyboard printer	.40	.49
D10	Other	.40	.22
T31	Establish and maintain authorization lists and master bench stock cards	.35	.05
T11	Distribute ADP equipment products	.32	.21
W1	Punch card accounting machines	.31	.06
Factor 14 – Material Control			
D9	*Material control*	.82	.10
W3	Material control – records validation	.70	.10
T45	Document and issue and turn in of tools and tool kits	.44	.06
T22	Revalidate due-outs and due-ins	.38	.29
T7	Prepare non-federal stock number control forms	.38	.14
A11	Initiate follow-up action on requisitions	.37	.31
A5	Log in AF Forms 601b and assign to each an EMO control number	.36	.04
A8	Annotation of AF Forms 601b with date and transaction serial number	.32	.01
A2	Establishment, change and deletion of a special level detail record	.30	.06

*T Job Task
**A Job Activity
@D Duty Assignment
#W Type of Work Environment

APPENDIX D: MATERIEL FACILITIES FACTORS

Task Nr	Task Statement	Loading	Proportion Performing*
Factor 1 – Warehousing			
T23*	Locate and select property as indicated on documents	.81	.57
T24	Complete document entries	.74	.24
D3**	Warehousing	.72	.30
T21	Prepare and input warehouse location	.71	.38
T25	Move property to delivery point	.70	.62
T19	Prepare and correct bin labels	.65	.52
T20	Update stock number directory	.57	.35
T18	Place location symbols on storage facilities	.56	.39
T31	Maintain warehouse document file	.53	.28
A8@	Locate items to be shipped, issued, or transferred	.49	.51
A11	Prepare or correct bin labels	.48	.39
A6	Place property in warehouse bins, racks, or bays	.46	.52
T22	Process output documents and listings	.45	.32
A10	Prepare and input warehouse location data	.44	.23
A18	Maintain records and files	.39	.25
A20	Update stock number directory	.37	.22
W3#	*Storing supplies and equipment*	.36	.17
T32	Distribute documents	.35	.49
T28	Process inquiries	.33	.30
W4	Issuing, shipping, and transferring supplies and equipment	.31	.20
Factor 2 – Receiving			
T13	Move property to delivery area	.89	.46
T14	Move property to storage area	.86	.46
T7	Compare information on tags and labels against documentation	.86	.54
T12	Move property to holding area	.81	.46
T10	Enter information on receiving documents	.56	.41
T15	Prepare turn-in documents	.56	.36
T11	Process management notices	.52	.20
T6	Prepare property for inchecking	.50	.41
T8	Prepare extract documents	.49	.26
T4	Prepare labels and tags for property	.40	.22
A4	Move property to areas such as delivery or storage	.38	.52
T29	Apply proper methods for handling property	.30	.83
Factor 3 – Remote Devices			
T16	Operate remote keyboard printer	.75	.24
T28	Process inquiries	.66	.30
T1	Perform remote device operator maintenance	.63	.19
T31	Maintain warehouse document file	.62	.28
T17	Operate remote card reader	.61	.16
T3	Verify operating procedures	.60	.17

Task Nr	Task Statement	Loading	Proportion Performing*
Factor 3 – Remote Devices (Continued)			
T32	Distribute documents	.51	.49
T22	Process output documents and listings	.48	.32
W5	Operating remote devices	.46	.10
T2	Clear rejects	.46	.17
T5	Prepare/process stock change documents	.42	.07
T20	Update stock number directory	.41	.35
T21	Prepare and input warehouse location data	.39	.38
A20	Update stock number directory	.39	.22
T11	Process management notices	.38	.20
T9	File, update, and input receipt due-in cards	.35	.17
Factor 4 – Receiving and Documentation			
T10	Enter information on receiving documents	.66	.41
T6	Prepare property for inchecking	.62	.41
T8	Prepare extract documents	.60	.26
A3	Prepare extract receiving documents	.53	.22
T9	File, update, and input receipt due-in cards	.50	.17
D1	Receiving	.48	.25
T17	Operate remote card reader	.36	.16
Factor 5 – Inventory			
D10	Other	.84	.06
T26	Prepare warehouse for inventory	.74	.25
T27	Make emergency issues	.56	.41
T2	Clear rejects	.48	.19
T3	Verify operating procedures	.46	.17
T1	Perform remote device operator maintenance	.40	.19
T20	Update stock number directory	.39	.35
T11	Process management notices	.39	.20
W9	Inventorying supplies and equipment	.37	.03
T22	Process output documents and listings	.38	.32
T18	Place location symbols on storage facilities	.32	.39
T24	Complete document entries	.31	.54
Factor 6 – Pickup and Delivery			
D4	Pickup and delivery	.81	.14
T30	Obtain authorized representative signatures	.69	.50
A13	Deliver property items	.59	.33
T32	Distribute documents	.58	.49
W6	Delivering supplies and equipment	.58	.22
T29	Apply proper methods for handling property	.50	.83
A14	Operate materiel handling equipment	.43	.46
A15	Drive car or pickup truck	.40	.43
A1	Offload supplies and equipment	.33	.52
Factor 7 – War Readiness Materiel (WRM)			
D6	WRM	.79	.03
T4	Prepare labels and tags for property	.60	.22

Task Nr	Task Statement	Loading	Proportion Performing*
Factor 7 – Ware Readiness Materiel (WRM) (Continued)			
T5	Prepare/process stock change documents	.60	.07
T9	File, update, and input receipt due-in cards	.51	.17
T17	Operate remote card reader	.47	.16
A9	Inventorying supplies and equipment	.39	.35
T11	Process management notices	.34	.20
T19	Prepare and correct bin labels	.34	.52
T18	Place location symbols on storage facilities	.33	.39
W9	Inventorying supplies and equipment	.33	.16
T3	Verify operating procedures	.32	.17
Factor 8 – Supply Point			
D7	Supply point	.80	.01
W2	Inspecting, identifying and classifying property	.80	.01
A6	Place property in warehouse bins, racks, or bays	.40	.52
A8	Locate items to be issued, shipped, or transferred	.38	.51
T26	Prepare warehouse for inventory	.37	.25
T27	Make emergency issues	.32	.41

*T Job Tasks
**D Duty Assignment
@A Job Activity
#W Type of Work Environment

☆U.S. GOVERNMENT PRINTING OFFICE: 1977- 771-057/31